various ether vapors at 100° C. were obtained by the well-known transpiration method. In the apparatus used the capillary was perfectly straight and the driving pressure obtained by a column of mercury descending under gravity. The most interesting substances examined were eight ethers, some of them extremely rare, divided into three groups of isomers. The results show the same fact for these propyl compounds that was observed by Lothar Meyer[1] and Steudel for butyl compounds, viz., the molecules of a tertiary compound are smaller than those of a secondary, which in turn are smaller than those of a primary.

William Campbell read a paper on the iron carbon series of alloys. The various published equilibrium curves of the series, by Roberts-Austen, Rooseboom, Le Chatelier, Benedicks and others, were reviewed. A series of lantern slides showed the various changes of structure which take place (*a*) by variation in composition; (*b*) by annealing at different temperatures. Two systems were shown to occur: I. austenite (mixed crystals) and cementite; II. austenite and graphite. The former is unstable, the latter stable.

WILLIAM CAMPBELL,
Secretary

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DISCUSSION AND CORRESPONDENCE

THE CLOCK OF THE U. S. NAVAL OBSERVATORY

TO THE EDITOR OF SCIENCE: While not desiring to appear to enter into any controversy with the author of the article on 'The Clocks of the Greenwich and the U. S. Naval Observatories' which appeared in your issue of May 31, it would seem that certain facts should be stated to clear up the misunderstanding that has occurred.

I think no one will disagree with the statement that the value of an astronomical clock is to be measured by the degree of accuracy with which its correction can be predicted from observed corrections or interpolated between those corrections: If a series of clock rates extending over several months can be shown to follow such a simple law as that given on page 451 of SCIENCE for March 22, 1907, for the Naval Observatory clock, *viz.*:

$$\text{Daily rate} = +0^{s}.0161 - 0^{s}.00103\,(T - \text{Mar. } 29.0) - 0^{s}.0456\,(t - 27°.0),$$

and when both these terms have such a probable explanation in physical phenomena, it would be folly to refrain from the use of this formula in investigating the running of the clock. It follows that the mean residual $0^{s}.015$ is what really indicates the performance of the clock and not $0^{s}.035$ as deduced by Mr. Lewis.

The statement by Mr. Lewis that in my article "the Greenwich clock rates are spread over a period of one year" is somewhat misleading as they were divided into twelve monthly groups and each group was considered by itself as is clearly shown on page 450 of SCIENCE for March 22, 1907. That would seem to be as fair a method of treating them as the published data would provide.

In conclusion attention may be called to the article in SCIENCE for April 12, 1907, page 570, 'A Riefler Clock and a Self-registering Right Ascension Micrometer,' in which it has seemed to the writer that the Naval Observatory clock runs even better than was indicated by the mean residual $0^{s}.015$.

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U. S. NAVAL OBSERVATORY

VARIATION IN THE COROLLA OF LINARIA VULGARIS MILL

TO THE EDITOR OF SCIENCE: In examining the *Linaria vulgaris* Mill., with a class in botany I found the following remarkable variations in the corolla which may be of interest to some of your readers. The flowers in which the variations appeared were all on the one specimen.

In the corolla of two of the flowers in which the variations occurred the spur was absent, as was also the usual orange-colored palate. The corolla in both these flowers consisted of five petals, but in one case there were four petals in the upper lip and one in the lower, while in the other all five petals were in the position usually occupied by the upper lip.

The corolla of a third flower was tubular,

[1] *Pogg. Ann.*, 1882, Vol. 16, p. 394.